Section 404(b) (1) Clean Water Act Compliance Evaluation
Sutter Basin Feasibility Study

I. Introduction

This appendix evaluates compliance of the recommended plan, Alternative SB-8, with the Guidelines established under the Federal Pollution Control Act (Clean Water Act) Amendments of 1972 (Public Law 92-500), as amended by the Clean Water Act of 1977 (Public Law 95-217), legislation collectively referred to as the Clean Water Act.
The Clean Water Act sets national goals and policies to eliminate the discharge of water pollutants into navigable waters. Any discharge of dredged or fill material into waters of the U.S. by the Corps requires a written evaluation that demonstrates that a proposed action complies with the guidelines published at 40 CFR Part 230. These guidelines, referred to as the Section 404(b) (1) Guidelines or "Guidelines," are the substantive criteria used in evaluating discharges of dredged or fill material under Section 404 of the Clean Water Act.

Fundamental to the Guidelines is the precept that "dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern."

The procedures for documenting compliance with the Guidelines include the following:

- Examining practicable alternatives to the proposed discharge that might have fewer adverse environmental impacts, including not discharging into a water of the U.S. or discharging into an alternative aquatic site
- Evaluating the potential short- and long-term effects, including cumulative effects, of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment.
- Identifying appropriate and practicable measures to mitigate the unavoidable adverse environmental impacts of the proposed discharge
- Making and documenting the Findings of Compliance required by §230.12 of the Guidelines.

This Clean Water Act, Section 404(b)(1) evaluation of compliance with the Guidelines is not intended to be a "stand alone" document; it relies heavily on information provided in the integrated feasibility and EIS/EIR to which it is attached.

II. Project Description

A. Project Purpose

The purpose of the proposed project is to reduce flood risk to a study area defined as the 300 square mile Sutter Basin located in Northern California in Sutter and Butte Counties within the 14,000 sq. mile Sacramento River Watershed. The Sutter Basin is located in north-central California in Sutter and Butte Counties. The elongated, irregularly shaped basin covers

about 326 square miles and is about 44 miles long north to south and up to 14 miles wide east to west. It is roughly bounded by the Feather River (to the east), Cherokee Canal, the Sutter Buttes, and Sutter Bypass (to the west, listed from north to south). Floodwaters potentially threatening the basin originate from the Feather River watershed or the upper Sacramento River watershed, above Colusa Weir. These waterways have drainage areas of 5,921 and 12,090 square miles, respectively. In addition to Yuba City, communities in the basin include Biggs, Gridley, Live Oak, and Sutter.

The project area is meant to provide spatial boundaries for evaluation of resources that may be more directly impacted by the Sutter Basin Feasibility Study (SBFS), and is therefore a smaller area, more immediate to the proposed project features. Specifically, the project area is defined as the footprint of where potential project actions would occur. This project area takes into consideration areas of potential direct impact as well as areas potentially affected by immediate indirect or secondary impacts. The study area encompasses a much larger area that provides spatial boundaries for resources that could potentially be indirectly impacted by the SBFS.

B. Location

The proposed levee improvement areas are located along the west levee of the Feather River from Thermalito Afterbay on the north to approximately 4 miles north of the Sutter Bypass on the south. The direct effects of the project are located in a corridor roughly 500 feet toward the land side of the existing levees and 100 feet toward the water side. This corridor was determined as the area in which levee improvements, such as seepage berms, stability berms, relief wells, setback levees, erosion protection, and slurry cutoff walls, are likely to occur. The corridor is approximately 41 miles long, divided into 41 relatively homogeneous reaches for ease of describing the affected environment, and potential environmental effects (note that this number is coincidental and one reach does not consistently correspond to a length of 1 mile. The project area would also include borrow/spoil sites or project mitigation sites outside of this corridor. Plate 1-1 from the integrated main report shows the overall Sutter Basin Feasibility Study project area (Refer to page 21). The project reaches are listed in Table 1-1, below.

Table 1-1 Contract and Corresponding Reach*

Contract	**A**	***Star Bend**	**B**	**C1**	**C2**	**D1**	**D2**
Corresponding Reach	2-5	6	7-12	13-18	19-25	26-33	34-41
Proposed Year of Construction	2018-2019	2018-2019	2017-2018	2013-2014	2014-2015	2015-2016	2016-2017

*Construction contract timing determined by risk to population centers.

C. General Description

An initial array of 10 alternatives (including the No-Action Alternative) was developed by USACE and the local sponsors (SBFCA and the State DWR) during the alternatives

formulation process. The alternatives represented varying combinations of measures.

Alternatives were initially developed based on the USACE' federal planning objectives for water resource projects, specific planning objectives developed for the feasibility study, and opportunities and constraints for implementing flood risk management activities. After formulation and refinement of the project alternatives, alternatives were ranked and screened based on FRM benefits and implementation costs. Chapter 3 of the integrated report addresses in greater detail the alternative formulation process.

The SBFS plan formulation process resulted in two action alternatives in the final array:

- Alternative SB-7 (National Economic Development Plan): Fix in Place Feather River, Sunset Weir to Laurel Avenue. This alternative focuses on levee improvements to reduce flood risk to Yuba City. SB-7 includes contracts A, Star Bend, B, C1, and C2.

- Alternative SB-8 (Recommended plan). This alternative includes SB-7 but extends Feather River fix-in-place levee improvements all the way north to Thermalito as shown in the figure below. This alternative addresses flood risk to Yuba City but also reduces risk to the smaller communities north of Yuba City. SB-8 includes contracts A, Star Bend, B, C1, C2, D1, and D2.

D. Background

Although the flood control structures have been extensively improved and upgraded since construction, the underlying foundation of most of the levees and channels pre-dates any state or USACE involvement and still retains the original materials that include dredged riverbed sands, soil, and organic matter. At the time of the Sacramento River Flood Control Project (SRFCP) authorization in 1917, the areas being protected by the levees were primarily agricultural with minimal improved infrastructure such as railroads and highways. Today, the area remains largely agricultural with population centers including Yuba City, Biggs, Gridley, Live Oak, and Sutter.

Over that past two decades, several studies have been conducted by USACE, DWR, or SBFCA to evaluate the condition of the levees protecting the planning area relative to criteria for stability, seepage, erosion, geometry, and levee height. These studies have indicated that the levee system is deficient and that the consequences of levee failure from a major flood event would be significant.

E. Authority and Purpose

The Corps ensure that the project complies with the CWA, including Sections 404, 401, and 402. Placement of fill within jurisdictional wetlands and waters of the United States is required for the project. A Section 401 State Water Quality Certification for activities associated with implementation of the proposed project is required as a condition of Section 404, and the sponsor will submit a 401 certification application to the RWQCB for each

contract. The project would also require an NPDES permit, through the development of a SWPPP because the project would disturb more than 1 acre of ground.

The primary purpose of the study is to reduce flood risk for the entire planning area by addressing known levee deficiencies along the Feather River West Levee from Thermalito Afterbay downstream to approximately 4 miles upstream of the confluence with the Sutter Bypass. The Corps project goal is to achieve a minimum of 200-year flood protection for the more urbanized areas with population centers and 100-year flood protection for the remaining more rural agricultural parts of the planning area. A 200-year flood is a flood that has a 0.5% chance of occurring in any given year, also referred to as a 0.5% annual exceedance probability (AEP). A 100-year flood has a 1% AEP.

III. Final Array of Alternatives

A. Guidelines

Section 230.10 of the Guidelines dictates that, except as provided under §404(b)(2), "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have significant adverse environmental considerations." While the NEPA process, through the EIS, extensively examines alternatives and discloses all of their environmental impacts, the 404(b) (1) Evaluation focuses on the impacts of alternatives to the aquatic ecosystem. The Guidelines require choosing for implementation the practicable alternative that has the least damage to the aquatic ecosystem, assuming that this alternative has no significant adverse environmental impacts to other components of the environment, such as endangered species that occupy upland habitat. A "practicable alternative" is defined as "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

The Guidelines also require that "where the activity associated with a discharge which is proposed for a special aquatic site does not require access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose (i.e., is not "water dependent"), practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise." The basic purpose of this project—to reduce flood risk to the Sutter basin study area—is water dependent, since the project purpose cannot be fulfilled outside the river.

B. Practical Alternative

The Guidelines further specify that where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge that do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless otherwise clearly demonstrated. The utility and canal relocation improvements occurring at Reaches 22, 23, 24, 28-29, and 43 are the only special aquatic site type in the project area. Section III, parts E and F describe the proposed activities for each reach.

For the purpose of a 404(b) (1) alternatives analysis, practicable alternatives include:

- Offsite alternatives—i.e., discharges of dredged or fill material at other locations in waters of the United States.
- On-site alternatives—these include project designs that do not involve a discharge of dredged or fill material into waters of the United States as well as project designs that have different impacts to waters of the U.S.

C. Off-Site Alternatives

The locations of this project were selected based upon the need for increased flood risk management and levee safety. Off-site alternatives therefore are not practicable at this time.

D. On-Site Alternatives

The two construction alternatives analyzed in detail through the NEPA process would each accomplish the identified project purpose. However, they would accomplish the project purpose to varying extents, with varying levels of benefits and varying adverse impacts to the aquatic ecosystem.

The following is a summary of project elements for each alternative. In general, Alternative SB-8 entails the greatest amount of levee improvement work and SB-7 the least amount. These alternatives are described in greater detail in Chapter 3 of the integrated report and EIS/EIR.

Alternative SB-8 includes 41 reaches (2 north to 41) along the FRWL alignment, beginning at station 180+00 (approximately 2,000 feet south of Laurel Avenue) and ending at station 2368+00 (Thermalito Afterbay). The proposed project features and measures for this alternative include:

- Soil-Bentonite Cutoff Walls
- Deep Soil Mix Cutoff Walls
- Jet Grouting Cutoff Walls
- Seepage Berms
- Levee Relocations
- Canal Relocations
- Embankment Reconstruction/Landside Toe Fill
- Erosion Protections
- Closure Structure
- Utility Improvements
- Utility Relocations
- Structural Relocations

These proposed features and measures will rehabilitate, replace, or tie in and function in junction with the existing system. The existing system includes the following features:

- Existing Embankment

- Existing Cutoff Walls
- Existing Stability Berms
- Existing Relief Wells
- Existing Closure Structures
- Existing Toe Drains

Alternative SB7 includes 21 reaches (2 north to 21) along the FRWL alignment, beginning at station 180+00 (approximately 2,000 feet south of Laurel Avenue) and ending at station 1433+83 (Thermalito Afterbay). The proposed project features and measures for this alternative include:

- Soil-Bentonite Cutoff Walls
- Deep Soil Mix Cutoff Walls
- Jet Grouting Cutoff Walls
- Seepage Berms
- Levee Relocations
- Canal Relocations
- Embankment Reconstruction/Landside Toe Fill
- Erosion Protections
- Closure Structure
- Utility Improvements
- Utility Relocations
- Structural Relocations

These proposed features and measures will rehabilitate, replace, or tie in and function in junction with the existing system. The existing system (see chapter 3) includes the following features:

- Existing Embankment
- Existing Cutoff Walls
- Existing Stability Berms
- Existing Relief Wells
- Existing Closure Structures
- Existing Toe Drains

E. General Description and Quantity of Dredged or Fill Material

Table 1-2. provides a general description of the quantity and fill materials for each site within the project. Permanent and temporary impacts are a result of Sacramento District Corps Regulatory analysis.

Table 1-2

Feature/Station Point	Fill Volume (cubic yards)	Permanent Impacts (acres)	Temporary Impacts (acres)
Contract A			
Reach 2 210+00 Irrigation Ditch Fill	109	0.066	.05
Reach 3 210+60 to 231+50 Irrigation Ditch Fill	1573	.32	
Reach 3 281+00 to 288+25 Irrigation Ditch Fill	1940	.40	
Reach 5 410+00 Irrigation Pond/Open Water Fill	122	.038	
Reach 5 410+00 Seasonal Wetland	62	.026	
Total Contract A	***3806***	***.85***	***0.05***

Feature/Station Point	Fill Volume (cubic yards)	Permanent Impacts (acres)	Temporary Impacts (acres)
Contract B			
Reach 7 513+00 to 543+50+00 Irrigation Ditch Fill	833	.385	
Reach 9 689+00 Irrigation ditch head works	39	.001	
Total Contract B	***872***	***.386***	***0***

Feature/Station Point	Fill Volume (cubic yards)	Permanent Impacts (acres)	Temporary Impacts (acres)
Contract C1			
Reach 16 1043+50 Drainage outfall Armoring	21	.006	.008
Total Contract C1	***21***	***.006***	***.008***
Contract C2			
Reach 20 1315+00 Riparian Forest Wetland – Inlet Reset	39	.002	
Reach 20 1315+00 Canal Ditch Fill	39	.001	
Reach 20 1346+50 Forested Wetlands	100	.002	
Reach 22 1429+00 to 1433+83 Sutter Butte Canal relocation	7500	0.9	0.9
Reach 24 1611+00 placement of a new concrete slab within the existing Sutter Butte Canal	13	.016	.033
Total Contract C2	***7691***	***.921***	***.933***

Feature/Station Point	Fill Volume (cubic yards)	Permanent Impacts (acres)	Temporary Impacts (acres)
Contract D1			
Reach 26 1675+00 Riparian Forest	75	.003	
Reach 28 to 29 1752+00 to 1766+00 Sutter Butte Canal relocation	5,185	2.0	2.0
Feature/Station Point	**Fill Volume (cubic yards)**	**Permanent Impacts (acres)**	**Temporary Impacts (acres)**
Reach 28 1766+00 Sutter Butte Canal Recharge Infill Headworks	66	.113	
Total Contract D1	5326	2.11	2

Contract D2			
Reach 34 2160+00 Tailing Area			0.005
Reach 35 2186+00 Tailing Area			0.011
Reach 35 2200+00 Tailing Area			0.002
Reach 35 2210+50 to 2220+00 Tailing Area			0.003
Reach 36 2229+00 to 2230+50 Tailing Area	450	.18	
Reach 40 2322+50 to 2330+50 Tailing Area	890	.55	
Reach 40 2334+00 Tailing Area	152	.063	
Reach 40 2348+00 Tailing Area	190	.118	
Reach 43 2359+00 to 2360+00 Old Sutter Butte Main Canal Head works	15,000	.6	0.1
Total Contract D	***16682***	***1.51***	***1.07***
Totals	***34,398***	***5.78***	***3.07***
Feature/Station Point	**Fill Volume Cubic Yards**	**Permanent Impacts Acres**	**Temporary Impacts Acres**
SB-7	***8,571***	***1.25***	***.058***
SB-8	***34,398***	***5.78***	***3.07***

F. Description of the Proposed Discharge Site(s)

Contract A Discharge into Waters of the U.S – Feature Description.

Reach 2 (210+00): An existing earthen agricultural irrigation ditch on the landside would be filled to accommodate the new levee prism. Approximately 109 cubic yards of material are required to permanently fill 480 lineal feet of ditch.

Reach 3 (210+60 to 231+50) Irrigation Ditch Fill: An existing concrete lined irrigation ditch on the landside would be filled to accommodate the new levee prism. Approximately 1573 cubic yards of material are required to permanently fill 1430 lineal feet of ditch.

Reach 3 (281+00 to 288+25) Irrigation Ditch Fill: An existing concrete lined irrigation ditch on the landside would be filled to accommodate the new levee prism. Approximately 122 cubic yards of material are required to permanently fill 1750 lineal feet of ditch.

Reach 5 (410+00) Irrigation Pond/Open Water Fill: An existing concrete lined irrigation pond on the landside would be filled to accommodate the new levee prism. Approximately 62 cubic yards of material are required to permanently fill 1130 square feet of seasonal wetland.

Contract B Discharge into Waters of the U.S – Feature Description.

Reach 7 (513+00 to 543+50+00) Irrigation Ditch Fill: An existing earthen irrigation ditch on the landside would be filled to accommodate the new levee prism. Approximately 833 cubic yards of material are required to permanently fill 3050 lineal feet of ditch.

Reach 9 (689+00) Irrigation Ditch Head Works: An existing earthen irrigation ditch head works on the landside would be filled to accommodate the new levee prism. Approximately 39 cubic yards of material are required to permanently fill 550 square feet of existing ditch. A new pipe section would be reconfigured to accommodate the new fill area.

Contract C1 Discharge into Waters of the U.S – Feature Description.

Reach 16 (1043+50) Drainage Outfall Armoring: An existing drainage outfall on the waterside would be filled to accommodate the new levee prism. Approximately 21 cubic yards of material are required to permanently fill 700 square feet of existing outfall area. New pipe sections would be reconfigured to accommodate the new fill area.

Contract C2 Discharge into Waters of the U.S – Feature Description.

Reach 20 (1315+00) Irrigation Ditch Head Works: An existing earthen irrigation ditch head works on the landside would be filled to accommodate the new levee prism. Approximately 39 cubic yards of material are required to permanently fill 550 square feet of existing ditch. A new pipe section would be reconfigured to accommodate the new fill area.

Reach 20 (1315+00) Riparian Forest Wetland – Inlet Reset: An existing earthen irrigation ditch head works on the waterside would be filled to accommodate the new levee prism. Approximately 39 cubic yards of material are required to permanently fill 550 square feet of existing ditch. A new pipe section would be reconfigured to accommodate the new fill area.

Reach 20 (1346+50): Forested wetlands on the waterside would be filled to accommodate the new levee prism. Approximately 100 cubic yards of material are required to permanently fill 2800 square feet of existing forested wetlands.

Reach 22 (1429+00 to 1433+83) Sutter Butte Canal Relocation: The new permanent canal alignment requires an offset 81 feet west of the center line of the existing canal. New canal dimensions are the same as existing - 45' across from top of bank to top of bank and 25’

bottom channel width. The total new channel realignment length is 800 feet. Canal relocation is necessary to obtain a required landside easement currently where the existing canal channel is located adjacent. Permanent fill requirements total 7500 cubic yards of material.

Reach 24 (1611+00): A utility enhancement requiring the placement of a new rectangular cross-section concrete depth indicator within the existing Sutter Butte Canal (landside) at approximately 1611+00. A 12 cubic yard protective concrete pad overlay at the base of the existing permanent irrigation canal will protect a pipe crossing during sediment removal procedures.

Contract D1 Discharge into Waters of the U.S.

Reach 28-29 (1721+60 to1754+50) Sutter Butte Canal Relocation The new permanent canal alignment requires an offset 81 feet west of the center line of the existing canal. New canal dimensions are the same as existing - 45' across from top of bank to top of bank and 25' bottom channel width. The total new channel realignment length is 1600 feet. Canal relocation is necessary to obtain a required landside easement currently where the existing canal channel is located adjacent. Permanent fill requirements total 15000 cubic yards of material.

Reach 28 (1766+00) Sutter Butte Canal Recharge Infill Headworks: Conveyance pipes through the existing levee at the head works on the landside would be filled to accommodate the new levee prism. Approximately 66 cubic yards of material are required to permanently fill 1350 square feet of existing earthen ditch. New pipe sections would be reconfigured to accommodate the new fill area.

Reach 34 (2160+00) Tailing Area: Temporary fill of wetland tailing area resulting from levee degradation.

Reach 35 (2186+00) Tailing Area: Temporary fill of wetland tailing area resulting from levee degradation.

Reach 35 (2200+00) Tailing Area: Temporary fill of wetland tailing area resulting from levee degradation.

Contract D2 Discharge into Waters of the U.S.

Reach 35 (2210+50 to 2220+00) Tailing Area: Temporary fill of wetland tailing area resulting from levee degradation.

Reach 36 (2229+00 to 2230+50) Tailing Area: Permanent fill of existing waterside tailing wetland area to accommodate the new levee prism. Approximately 450 cubic yards of material are required to permanently fill 7800 square feet of area.

Reach 40 (2322+50+00 to 2330+50) Tailing Area: Permanent fill of existing landside tailing wetland area to accommodate the new levee prism and maintenance road. Approximately 890 cubic yards of material are required to permanently fill 16,000 square feet of area.

Reach 40 2334+00) Tailing Area: Permanent fill of existing landside tailing wetland area to accommodate the new levee prism and maintenance road. Approximately 152 cubic yards of material are required to permanently fill 4100 square feet of area.

Reach 40 (2348+00) Tailing Area: Permanent fill of existing landside tailing wetland area to accommodate the new levee prism and maintenance road. Approximately 190 cubic yards of material are required to permanently fill 5100 square feet of area.

Reach 43 (2359+00 to 2360+00): The Old Sutter Butte Main Canal Headworks will be permanently filled to create a contiguous levee structure. The existing vehicular bridge will be removed and replaced with 15,000 cubic yards of levee earthen fill and slurry wall materials.

G. Timing and Duration of Discharge

The construction activities that would affect the waters of the U.S. would be conducted over six years, beginning in late July 2013 and continuing into September of 2019. Canal relocations and improvements would occur in February and March when the canal is dry. Drainage ditch and levee improvements would be conducted during the spring and summer months.

H. Description of Disposal Method

Placement of fill materials includes the use of excavators and loaders. Construction equipment would not operate within the river channel.

IV. Factual Determinations (Section 230.11)

A. Physical Substrate Determinations (consider items in Section 230.11 and 230.20 Substrate)

(1) Substrate Elevation and Slope. SB-8 project elevations vary from 130 feet above sea level to 25 feet above sea level with an average channel slope 2.5 feet per mile SB-7 project elevations vary from 80 feet above sea level to 25 feet above sea level with an average channel slope 2.5 feet per mile.

(2) Sediment Type. Soils and sediment type for both Alternatives SB-8 and SB-7 are composed of river deposits which include silts, sands, gravel, and bedrock.

(3) Dredged/ Fill Material Movement:

a) Fill: Alternatives SB-8 and SB-7 require permanent filling of irrigation ditches/canals, wetlands, and existing and former canal headworks. Placement of new fill materials would be above the ordinary high water mark would not have any effect on hydraulic movement.

b) Irrigation Ditch and Levee Improvements: SB-7 and SB-8 both include irrigation ditch and levee improvements. Irrigation ditch work requires replacement of drainage pipes which would not affect or aid in erosion or transport of backfill material. Levee improvements stated in this analysis require the placement of materials above the ordinary high water mark. Placement of the new levee structure and fill materials will not have any effect on hydraulic movement.

c) Canal Relocation: Alternatives SB-8 and SB-7 both include canal relocations. Migration of fill material would not be possible since pre and post construction activities required to fill the canal channels are completely isolated from the new and existing canal alignments. Work will be scheduled during months when the canal is dry (February and March).

(4) Physical Effects on Benthos (burial, changes in sediment type, etc.).

a) Fill: Alternatives SB-8 and SB-7 require permanent filling of irrigation ditches/canals, wetlands, and existing and former canal headworks. Placement of new fill materials would be above the ordinary high water mark would not have any effect on benthos.

b) Irrigation Ditch and Levee Improvements: Alternatives SB-8 and SB-7 irrigation ditch and levee improvement work will have no effect on benthos. Work areas are located of the river main channel for both alternatives.

c) Canal Relocation: Alternatives SB-8 and SB-7 canal relocations would not affect benthos since is the relocations occurring within each alternative are located out of the river main channel.

(5) Turbidity

a) Fill: Alternatives SB-8 and SB-7 require permanent filling of irrigation ditches/canals, wetlands, and existing and former canal headworks. Placement of new fill materials would be above the ordinary high water mark and would not affect turbidity.

b) Irrigation Ditch and Levee Improvements: Alternatives SB-8 and SB-7 irrigation ditch and levee improvement work will have no effect on turbidity since construction activities are located out of the river main channel

c) Canal Relocation: The canal relocations located within both Alternative SB-8 and SB-7 will have no effect on turbidity since the relocations

occurring within each alternative are located out of the river main channel and the work would be executed during dry months.

(6) Actions Taken to Minimize Impacts. Best Management Practices (BMP's) will be employed to avoid and minimize run-off, sedimentation, and erosion.

B. Water Circulation, Fluctuation, and Salinity Determinations

(1) Consider effects on (for both Alternatives SB-8 and SB-7):

a) Salinity. Not applicable.
b) Water Chemistry (pH, etc.). No significant effect.
c) Clarity. No significant effect.
d) Color. No significant effect.
e) Odor. No significant effect.
f) Taste. No significant effect.
g) Dissolved Gas Level. No significant effect.
h) Nutrients. No significant effect.
i) Eutrophication. No significant effect.
j) Others as Appropriate. No significant effect.

(2) Current Patterns and Circulation (for both Alternatives SB-8 and SB-7). No significant effect.

(3) Normal Water level Fluctuations (for both Alternatives SB-8 and SB-7): No significant effect.

(4) Salinity Gradients (for both Alternatives SB-8 and SB-7): Not applicable

(5) Actions That Will Be Taken to Minimize Impacts (for both Alternatives SB-8 and SB-7). Since disturbance throughout the project is greater than 1 acre, the contractor would be required to file and adhere to a Storm water Pollution Prevention Plan (SWPPP).

C. Suspended Particulate/ Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in Vicinity of Disposal Site (for both Alternatives SB-8 and SB-7). No significant effect.

(2) Effects, Degree, and Duration on Chemical and Physical Properties of the Water Column (for both Alternatives SB-8 and SB-7):

a) Light Penetration. No significant effect.
b) Dissolved Oxygen. No significant effect.
c) Toxic Metals and Organics. No significant effect.
d) Pathogens. Not applicable.
e) Esthetics. Not applicable.

f) Others as Appropriate. No significant adverse effects to the chemical and physical properties of the water column are anticipated.

(3) Effects on Biota (for both Alternatives SB-8 and SB-7):

Primary Production, Photosynthesis. No significant adverse effects to the primary production and photosynthesis processes are anticipated.
(Suspension/ Filter Feeders. No significant adverse effects to suspension and filter feeders are anticipated.
Sight Feeders. No significant adverse effects to sight feeders are anticipated.

(4) Actions Taken to Minimize Impacts (for both Alternatives SB-8 and SB-7). Since disturbance throughout the project is greater than 1 acre, the contractor would be required to file and adhere to a Storm water Pollution Prevention Plan (SWPPP).

D. Contaminant Determinations. The proposed project Alternatives SB-8 and SB-7 would not add contaminants to any nearby body of water. Best management practices to reduce the potential of accidental spills during gravel injection would follow all regulatory requirements in conjunction with the National Pollution Discharge Elimination System permitting process.

E. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton. The proposed project Alternatives SB-8 and SB-7 would have no affect on plankton communities.

(2) Effects on Benthos. The proposed project Alternatives SB-8 and SB-7 would have no effect on benthos communities.

(3) Effects on Nekton. The proposed project Alternatives SB-8 and SB-7 would have no effect on nekton communities.

(4) Effects on aquatic Food Web. The proposed project Alternatives SB-8 and SB-7 would have no effect on the aquatic food web, or the plankton, benthic and nekton communities with the proposed project.

(5) Effects on Special Aquatic Sites.

a) Sanctuaries and Refuges. The proposed project Alternatives SB-8 and SB-7 would require work adjacent to the Bobelaine Audubon Sanctuary. Appropriate fencing and BMP's would be utilized to reduce impacts to wildlife resources. Any potential impacts would be temporary and less than significant for both alternatives.
b) Wetlands. Alternatives SB-8 and SB-7 both permanently impact wetlands. SB-8 requires filling 0.033 acres of wetlands. SB-7 requires

filling 0.03 acres of wetlands. Impacts to filled wetlands would be mitigated by purchasing credits at an offsite mitigation bank.

c) Mud Flats. None exist in project area.
d) Vegetated Shallows. None exist in project area.
e) Coral Reefs. None exist in project area.
f) Riffle and Pool Complexes.

(6) Threatened and Endangered Species**.**

a) Alternatives SB-8 and SB-7 are not likely to result in adverse water quality or noise effects on spring run Chinook salmon, steelhead, and green sturgeon or their critical habitat. Restriction of all work activities to the proposed construction footprints and adherence to all erosion and sediment control BMPs would further minimize the potential for project-related increases in turbidity and suspended sediment in the Feather River. Implementation of a spill prevention, control, and countermeasure plan and bentonite slurry spill contingency plan is anticipated to minimize the potential for toxic or hazardous spills or discharges into the Feather River. Based on the location and duration of pile driving activities and other noise-generating activities, potential noise and vibration impacts on fish are expected to be negligible.

b) Alternatives SB-8 and SB-7 are not likely to result in adverse modification of the PCEs of critical habitat of spring-run Chinook salmon, steelhead, and green sturgeon. There would be no direct physical modification of riparian vegetation or SRA cover within the designated critical habitat of these species below the high water mark. Temporary and permanent losses of riparian vegetation for Alternative SB-8 would be limited to approximately 42.5 acres of riparian forest and scrub-shrub within the permanent and temporary footprints of the project above the OHWM. Approximately 891 trees (mixed native and non-native riparian and orchard trees) would be removed from the waterside levee slope and toe. Temporary and permanent losses of riparian vegetation for Alternative SB-7 would be limited to approximately 24.42 acres of riparian forest and scrub-shrub within the permanent and temporary footprints of the project above the OHWM. Approximately 652 trees (mixed native and non-native riparian and orchard trees) would be removed from the waterside levee slope and toe. The removal of vegetation from these areas may indirectly affect critical habitat through temporal reductions in large wood recruitment, nutrient contributions, and other riparian functions. However, the sponsor proposes to compensate for permanent and temporary losses of woody riparian vegetation through a combination of onsite and offsite compensation. Onsite compensation may include re-vegetation of waterside slopes and floodplain areas within the project footprint or in the project vicinity.

c) The canal relocations within SB-8 and SB-7 may affect but are not likely to adversely affect Giant Garter Snake (GGS) and its' critical habitat. Effects to GGS aquatic habitat are unlikely since canal relocation will occur during dry canal months of February and March. The upland habitat and potential overwintering habitat adjacent to the existing canals will be fenced appropriately to avoid impacts to the GGS during relocation and filling activities. Implementation of FWS conservation measures as cited in the April 2013 Biological Opinion will avoid and minimize impacts to the GGS.

(7) Other Wildlife. The proposed project action would have no significant adverse effect on wildlife because construction is linear and limited to specific areas. The duration of adverse effects is temporary. Any displaced wildlife would be expected to return to the area after the action is completed.

(8) Actions to Minimize Impacts. There would be no significant adverse effects to wildlife due to proposed project action. Therefore, there would be no minimization measures needed.

F. Proposed Disposal Site Determinations

(1) Mixing Zone Determination (for both Alternatives SB-8 and SB-7) Not applicable.

(2) Determination of Compliance with Applicable Water Quality Standards (for both Alternatives SB-8 and SB-7). No water quality or effluent standards would be violated during proposed project action.

(3) Potential Effects on Human Use Characteristics (for both Alternatives SB-8 and SB-7). The proposed project would not have any significant adverse effects to municipal and private water supply, recreational and commercial fisheries, or water-related recreation. Any displacement of recreational activities would be temporary.

G. Determination of Cumulative Effects on the Aquatic Ecosystem

The potential cumulative impacts from implementation of the Preferred Alternative considered with other relevant actions in the general vicinity of the Sutter Feasibility Study, have been assessed and are discussed in Section 4.12 of the EIS. Nearly all potentially significant impacts from Alternatives SB-8 and SB-7 could be reduced to less than significant levels by mitigation measures specified in this EIS. The Alternatives would not have any significant cumulative effects on the aquatic ecosystem. Implementation of the either the recommended plan (SB-8) or the NED (SB-7) Alternatives will provide flood safety protection which benefits adjacent communities.

H. Determination of Secondary Effects on the Aquatic Ecosystem

Secondary effects (or impacts) are "effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material" (40 CFR 230.11(h) (1)). Therefore, secondary effects are limited to other actions in the aquatic environment that are indirectly related to implementation of the action, such as erosion or downstream sedimentation, or compensatory mitigation.

Implementation of the recommended plan(SB-8) or the NED (SB-7) could result in the potential secondary impacts such as the unintentional placement of fill material outside of the proposed project area, and an increase in contaminants from construction vehicles and equipment. These actions could result in additional adverse impacts to water quality, erosion and accretion patterns, aquatic and other wildlife habitat, recreation, aesthetics and air quality. To help minimize impacts associated with the placement of fill material outside the proposed project area, Corps construction contracts require that the contractor mark the project boundaries, and that all work be conducted either when the project area is dewatered or that the contractor install erosion control (i.e. silt fencing, silt curtains) within any standing waters. Additionally, the contractor will be required to adhere to the details of a Storm Water Pollution Prevention Plan (SWPPP) plan which prevents or reduces adverse impacts to water quality from runoff.

V. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

A. Adaptation of the Section 404(b) (1) Guidelines to this Evaluation: No significant adaptations of the guidelines were made relative to this evaluation of the recommended plan (SB-8) or the NED (SB-7).

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Impact on the Aquatic Ecosystem: Alternatives SB-8 and SB-7 create impacts to the waters of the United States and associated aquatic systems. SB-8 creates 5.78 acres of permanent impacts and 3.07 acres of temporary impacts. SB-7 results in 1.25 acres of permanent impacts and 0.058 acres of temporary impacts. (Refer to 1-2 for exact locations and quantities.) SB-8 creates more impacts to the waters of the United States than SB-7. The total project length for SB-8 is 41 miles compared to SB-7 which is 24 miles long. Therefore, SB-8 creates more impact to the waters of the United States based upon the additional 16 mile of proposed work. No alternative exists which does not involve discharge of fill and rock materials into waters of the U.S.

Alternative SB-7 does not provide the range and extents of flood risk management and study objectives as Alternative SB-8. SB-7 involves discharge of fill and rock materials into the waters of the U.S. and has less adverse effects on the aquatic ecosystem than SB-8. However, SB-7 does not meet the study's planning objectives which include reducing the risk to life, health, public safety, property damage, and critical infrastructure from flooding.

The recommended plan (SB-8) meets the Corps 404 (b) (1) permit criteria of the least environmentally damaging practical alternative (LEDPA). The 404 (b)(1) guidelines, § 230.3 Definitions (q) define practicable as 'a means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. The Corps also conducts a public interest review. This review considers a number of factors, including safety, flood hazards, floodplain values, economics, and the needs and welfare of the population at risk. These factors guide the selection of the alternative that provides a reduction in flood risk and a greater margin of safety to a larger number of people. The recommended plan (SB-8) provides a locally preferred level of flood risk reduction.

Appropriate steps to minimize potential adverse impacts of the discharge on the waters of the United States and associated aquatic systems would be implemented. The proposed disposal sites for the discharge of fill and rock materials would meet construction plan and specification guidelines and comply with the requirements of practicable conditions and measures to minimize pollution or adverse effects to the aquatic ecosystem. Permanent impacts to the waters of the United States and associated wetlands would be mitigated by purchasing credits from a wetlands mitigation bank.

C. Compliance with Applicable State Water Quality Standards, and; Compliance with Applicable Toxic Effluent Standard or Prohibition Under Section 307 of the Clean Water Act: State water quality standards would not be violated. Alternatives SB-8 and SB-7 would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. Compliance with Endangered Species Act (ESA) of 1973: The Corps has initiated consultation with USFWS and NOAA Fisheries under Section 7 of the Endangered Species Act (16 U.S.C. 1536[c]) for potential effects to listed species and their critical habitats for both Alternatives SB-8 and SB-7. All terms and conditions of the Biological Opinion from the USFWS will be fully implemented. Refer to Appendix D, Sub-Appendix C for the terms and conditions.

E. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection, Research, and Sanctuaries Act of 1972: Not applicable to both Alternatives SB-8 and SB-7.

F. Evaluation of Extent of Degradation of the Waters of the United States: The placement of fill and rock materials would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife would not be adversely affected. No significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values would occur .

(1) Significant Adverse Effects on Human Health and Welfare (Alternatives SB-8 and SB-7).

a) *Municipal and Private Water Supplies*. No significant effect.
b) *Recreation and Commercial Fisheries*. No significant effect.

c) *Plankton*. No significant effect.
d) *Fish*. No significant effect.
e) *Shellfish*. No significant effect.
f) *Wildlife*. No significant effect.
g) *Special Aquatic Sites*. No significant effect.

(2) Significant Adverse Effects on Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems. None for both lternatives SB-8 and SB-7 .

(3) Significant Adverse Effects on Aquatic Ecosystem Diversity, Productivity, and Stability. None for both lternatives SB-8 and SB-7 .

(4) Significant Adverse Effects on Recreational, Esthetic, and Economic Values. Temporary and not significant. None for both lternatives SB-8 and SB-7 .

End of Evaluation

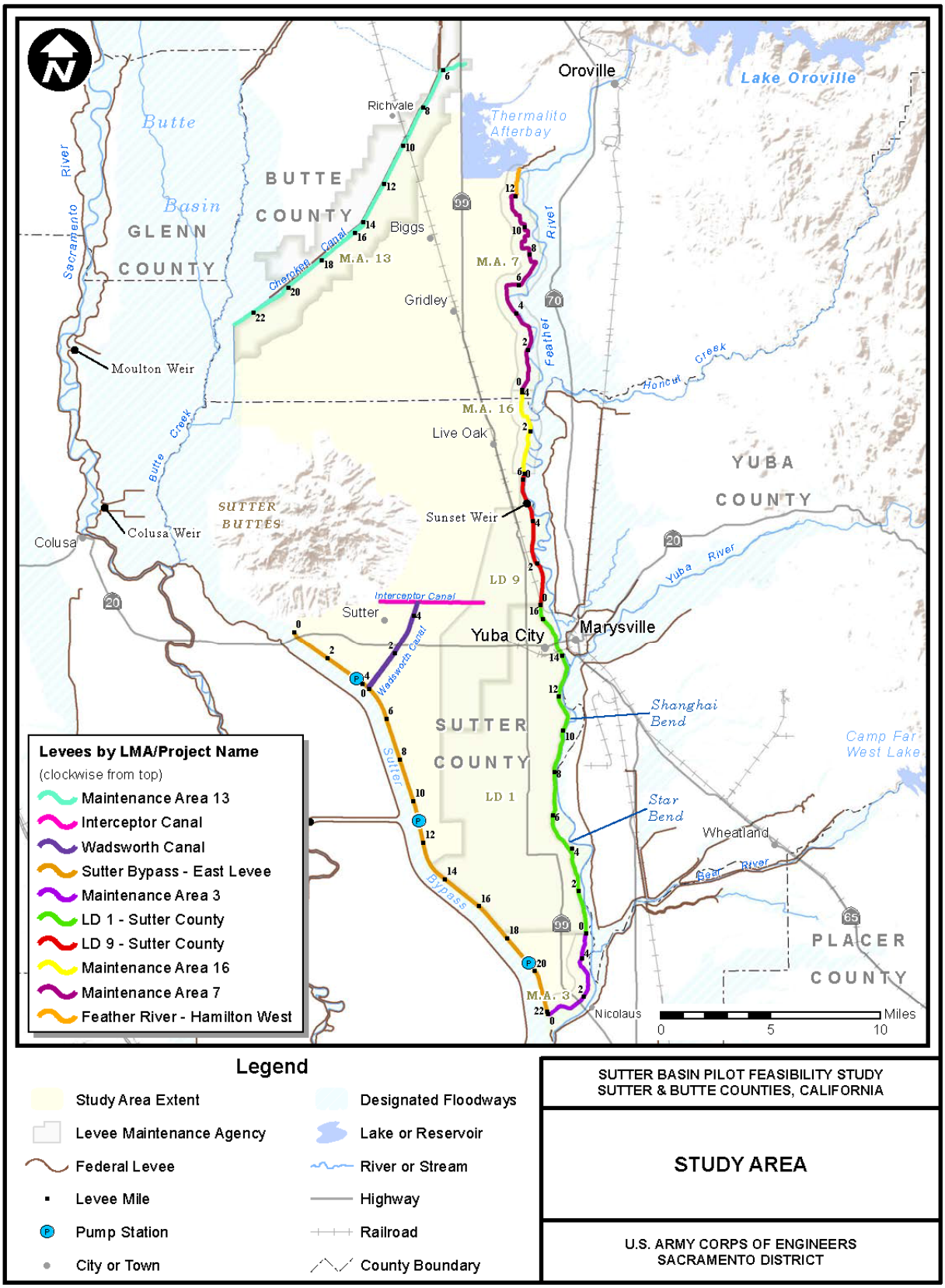

Plate 1-1. Study Area